Things of science

SURVIVAL FOOD

Unit No. 250

received by a Group of Friends of Science; sponsored and distributed without profit by Science Service, the Institution for the Popularization of Science, 1719 N Street, N.W., Washington 6, D. C. Watson Davis, Director

This THINGS of science unit gives some information and insight with regard to problems of food and health substances that would be useful in an atomic or other national emergency. Some of the materials and foods are also being distributed to the ill-fed regions of the world.

There are included three unusual foods, a food supplement and a material for making water safe for drinking. Eighteen experiments can be performed with the material in this THINGS unit.

First identify the materials in this unit:

MPF -- Multipurpose food, a soy bean product that has been enriched with the various factors needed for a complete diet.

SURVIVAL RATION -- A cracker made from enriched flour containing wheat, corn and soy bean.

BULGUR WHEAT -- Coarsely ground wheat grain with only part of the outer husk removed.

VITAMIN C -- White tablet which contains 100 milligrams of ascorbic acid.

IODINE TABLET -- Tablet in the special plastic and foil container for use in the purification of contaminated water.

Food is one of the minimum essentials for the survival of the human race. A considerable percentage of man's time, energy and wealth is devoted to this aspect of man's existence. He is concerned primarily with the production of adequate quantities of food, the distribution of these supplies where it is needed and the satisfactory storage of it until it can be used.

Food ranks in the same category with clothing and shelter as necessary for survival.

Although man has developed very good methods for producing and distributing food supplies, there are special circumstances that require careful attention today. Because of the wide-spread destruction that is possible in the case of a thermonuclear or atomic war, each family may have to live under survival conditions completely isolated from the rest of the community.

The Office of Civil and Defense Mobilization recommends that each family maintain a special food and water supply for use in case of a nuclear attack. These supplies should be sufficient to serve the family for a minimum of two weeks. This is the time estimated for the intensity of the radioactive fall-out to drop to a safe level.

Food to be used for such storage must meet two requirements. It should be nutritionally adequate and it should not deteriorate on storage. MPF and the Survival Biscuit meet these requirements.

Experiment 1 -- Examine the envelope of MPF. Note its color, odor and taste.

Developed in 1944 by Dr. Henry Barsook of the California Institute of Technology, MPF has been distributed to more than 100 countries as a concentrated food by Meals for Millions Foundation. In the United States MPF is manufactured and sold by General Mills, Inc., of Minneapolis, Minn., which furnished the package found in this unit of THINGS.

It includes the various factors that are needed for a balanced diet. These include proteins, carbohydrates, fats, minerals and vitamins. In a regular metal container, it has excellent storage properties.

The protein in MPF is toasted soy bean protein, which is

a very adequate source of the building blocks needed by the body for proper growth and metabolism. Protein can also furnish energy needed by the body.

The carbohydrates and fats in this formula are necessary for the production of energy in the body. These are burned in the body producing heat and chemical energy as well as carbon dioxide and water. The net result is the same as though they were burned in a fire.

The vitamins in this concentrated food include A, B_1, B_2, B_6, B_{12}, C, D, and niacin. These are the commonly accepted vitamins considered to be necessary for the maintenance of health. In addition, the following minerals are present in the formula: calcium, iron, phosphorus and iodine.

The quantities of all these various factors in MPF are such that six ounces a day will provide adequate amounts for an adult under survival conditions. This gives one rather simple answer to the food storage problem for a national emergency.

Experiment 2 -- Place one-fourth of a teaspoonful of MPF in one quarter of a glass of fruit juice. Stir this well. Note how well the solid is dispersed in the liquid. How does the mixture taste?

Even though a food such as MPF is adequate nutritionally and has good storage properties, there still may be a problem of acceptability. People may just refuse to eat it. Therefore, we must devise ways of serving it so that people will be able to eat six ounces a day.

Experiment 3 -- Place one-fourth of a teaspoonful of MPF in one quarter of a cup of hot soup. Stir the mixture well. How does this taste?

Experiment 4 -- Place one-fourth of a teaspoonful of MPF in one quarter of a cup of breakfast cereal. Stir this mixture well. Does this taste good to you?

The above three experiments are some of the ways recommended for the consumption of MPF. Other ways that have been recommended include eating it dry without further cooking as well as adding it to such foods as ground meat and bread before they are cooked. You see that MPF is very useful because of its versatility. Can you think of some interesting ways to use this material in foods?

Experiment 5 -- Place one-fourth of a teaspoonful of MPF in one quarter of a glass of milk. How does this mixture look to you? How does it taste?

Experiment 6 -- Some very interesting science projects can be developed to test the effectiveness of this food. You could use a laboratory animal such as a rabbit or a rat. Perhaps you would even like to try a controlled experiment on yourself. To do this you would need to carefully work out your experiment under the supervision of your science teachers or other qualified persons. Additional quantities of MPF may be obtained from General Mills in Minneapolis.

Experiment 7 -- Since a concentrated food of this type may be used in many situations, it would be interesting to devise experiments to determine its value under unusual circumstances. Can you devise conditions duplicating those of an astronaut circling the earth for two weeks in a space ship? How about a station on the moon?

Experiment 8 -- Although MPF is sufficient as a food under survival conditions, the number of calories furnished is not adequate indefinitely. Six ounces daily will furnish only 450 calories. For continued usage additional calories must be furnished. Can you suggest concentrated foods of high caloric value that might be used in conjunction with MPF? Remember that such foods should have good storage properties also.

Since the vitamin C content of most foods decreases on storage, additional supplies of this very important substance are

needed. Fortunately, tablets containing this vitamin in a very stable form are readily available at very low cost. Any supply of food stored for emergency use should include them.

Experiment 9 -- Examine the vitamin C tablet. Break off a small portion of the tablet. How does it taste? Does it have the sour taste of an acid? Vitamin C is also known as ascorbic acid.

The vitamin C tablet found in this unit of THINGS of science was furnished by Merck, Sharp and Dohme, a division of Merck & Co., Inc., of West Point, Pennsylvania.

The vitamin C tablet in this unit of THINGS contains 100 milligrams of ascorbic acid. Since the recommended quantity of this vitamin per day for an adult is only 30 mg., one-half of the tablet is sufficient to provide the necessary amount.

The Survival Ration cracker is another food designed for use under survival conditions. It is prepared from wheat flour, soy bean flour and corn flour with added vitamin B_1. It is manufactured by the National Biscuit Company of New York which furnished the cracker in this unit of THINGS. These crackers will be available to federal, state and local Civil Defense organizations, government agencies and industrial groups in late 1961.

This product was developed by the National Biscuit Company at the request of the Bureau of Nutrition of the New York Health Department for the New York State Civil Defense Commission. Each cracker contains 30 calories so that 66 crackers per day will provide the 2,000 calories needed to sustain a normal adult. The crackers are packed in hermetically-sealed tin which will preserve them for approximately five years.

The cracker in this unit of THINGS was part of the first production for general use.

Experiment 10 -- Examine the Survival Ration cracker. How does it smell? How does it taste?

Experiment 11 -- Spread margarine or butter over a small portion of the cracker. How does this taste?

Experiment 12 -- Spread jelly or preserves over another portion of the cracker. How does this taste?

Another interesting concentrated food that is of importance for consideration as a survival food is bulgur wheat. Sometimes called bulgor or bulghour wheat, it has been used in this country only in certain nationality restaurants and can be found in a few specialty groceries.

High quality wheat is processed in one continuous operation which washes, dries and cracks the wheat. Only the outer fibrous parts of the wheat are discarded. This product is widely used in the Near East.

Experiment 13 -- Examine the sample of bulgur wheat. Note that it is ground coarsely giving particles that have an appearance similar to that of unpolished rice. How does it taste? How does it smell?

This very versatile food is highly nutritious and has good storage properties. It can be boiled in water to produce a tasty gruel or it can be used in a variety of dishes from soups to desserts.

Experiment 14 -- Place one teaspoonful of bulgur wheat in a cup of boiling water. Boil for fifteen minutes. How does it taste? What is its odor?

The bulgur wheat found in this unit of THINGS was furnished by the Fisher Flouring Mills Company of Seattle, Wash.

One of the problems encountered in the storage of drinking water is that of maintaining its purity. Storage in glass or tin containers is the most satisfactory method of storage. This does not always prove to be completely safe. It is advisable to provide water purification tablets to assure protection from water-borne diseases.

During World War II, the tablets that were used for this purpose contained compounds that released chlorine in the water. However, it has been found that tablets that release iodine in the water provide greater protection.

Experiment 15 -- Look at the iodine water-purification tablet in its special four-layered plastic-foil container. Immerse the container in water. Note that the tablet remains dry.

The storage of these iodine tablets is a difficult problem due to the fact that the iodine is somewhat corrosive and that the tablet is decomposed by only traces of moisture. The Army Quartermaster Corps is developing special packaging materials to be used in storing these tablets.

The packaging material used for the iodine tablet consists of four layers. The layer next to the tablet is polyethylene. The second layer is aluminum foil. The third layer is polyethylene while the outside layer is cellophane. This provides a material that will protect the iodine tablet from water and that will withstand the corrosive effects of iodine.

Experiment 16 -- Remove the tablet from the plastic container. Note that one side of the package has a separation of the two sides of the container which may be grasped to open the package quite readily. Add the tablet to a quart of water. Allow to stand for three minutes. Stir the water thoroughly and allow to stand for ten minutes. Observe the appearance and color of the water. Can you detect the presence of the iodine tablet by odor or taste?

The iodine in the tablet is in the form of a chemical compound called tetraglycine hydroperiodide. This tablet will release eight milligrams of iodine on contact with water. Iodine has been found to destroy water-borne bacteria such as typhoid as well as amoebic cysts and many viruses.

Things of science No. 250

SURVIVAL FOOD UNIT

Science Service Washington 6, D. C.

The iodine tablet was furnished by the Maltbie Laboratories Division of Wallace & Tiernan, Inc., of Belleville, New Jersey. The tablets were packaged by Ivers-Lee Company of Newark, New Jersey.

Experiment 17 -- You can carry out a very simple test to prove the presence of free iodine in the water. Prepare a starch solution by placing a teaspoonful of corn starch or wheat flour in a cup of boiling water. Boil for three minutes. Allow this solution to cool to room temperature. Add one teaspoonful of the water containing the iodine tablet. A deep blue color will indicate the presence of free iodine.

This simple test can be used to detect the presence of starch in foodstuffs. Starch is usually classified as a carbohydrate in an ordinary food analysis. MPF is 50% protein, 15.5% carbohydrate and 1.0% fat. The Survival Ration cracker is 7.8% protein, 80% carbohydrate and 8.3% fat. Bulgur wheat is approximately 15% protein, 70% carbohydrate and 5% fat.

Experiment 18 -- To test these materials for starch, boil a teaspoonful of each one in a separate cup of water for 15 minutes. Strain off the clear solution through a clean cloth. Allow to cool to room temperature. Add a teaspoonful of the water containing the iodine tablet to each of the solutions. A deep blue color indicates the presence of starch. One of these materials contains no starch. Which one is it?

* * *

Production by Burrell Wood

Unit No. 250 Issued August 1961